L.N. 416 of 2002

THE METROLOGY ACT
ACT NO. XXV OF 2002

Use of Bottles as Measuring Instruments Regulations, 2002

IN exercise of the powers conferred by Article 19 of the Metrology Act, the Malta Standards Authority has made the following regulations :-

1. (1) The title of these regulations is the Use of Bottles as Measuring Instruments Regulations, 2002. Citation and commencement.

(2) These regulations shall come into force on such date or dates as the Authority may by notice in the gazette appoint and different dates may be so appointed for different purposes and different provisions of these regulations.

2. For the purposes of these regulations, all the definitions in the Malta Standards Authority Act shall apply, and in addition, unless the context otherwise requires: Definitions. Cap 419.

"bottles" shall have the meaning assigned to it by regulation 3 hereto.

3. (2) These regulations shall apply to containers commonly called bottles, made of glass or any other substance having such rigidity and stability that it offers the same meterological guarantees a s glass, when such containers: Applicability.

(1) are stoppered or designed to be stoppered and are intended for the storage, transport or delivery of liquids,

(2) have a nominal capacity of between 0.05 litre and five litres inclusive,

(3) have meterological characteristics (design characteristics and uniformity of manufacture) such that they can be used as

measuring containers, i.e. when they are filled up to a specified level or to a specified percentage of their brim capacity their contents can be measured with sufficient accuracy.

(2) Such containers shall be called measuring container bottles.

Bottles with EEC marks etc

4. (1) Only measuring container bottles which meet the requirements of these regulations may be marked with the EEC sign provided for in the third subparagraph of paragraph 5 of Annex 1.

(2) Such bottles shall be subject to meterological control under the conditions specified in the Annexes.

(3) The marketing and use as measuring containers of bottles which satisfy the requirements and tests laid down in these regulations may not be refused, prohibited or restricted for reasons concerning their volume, the determination of their volume or the methods by which they have been checked .

ANNEX I

1. Measuring container bottles shall be characterized by the following capacities which are always specified for a temperature of 20°C:

   1.1. the nominal capacity V_n is the volume which is marked on the bottle; it is the volume of liquid which the latter is deemed to contain when it is filled in the conditions of use for which it is intended;

   1.2. the brim capacity of the bottle is the volume of liquid it contains when filled to the brim;

   1.3. the actual capacity of the bottle is the volume of liquid it in fact contains when it is filled exactly under the conditions corresponding theoretically to the nominal capacity;

2. There are two methods of filling measuring container bottles:

   1) to a constant level,

   2) to a constant vacuity.

   The distance between the theoretical filling level for the nominal capacity and the brim level and the difference between the brim capacity and the nominal capacity, known as the volume of expansion or vacuity, shall be perceptibly constant for all bottles of the same type, that is, for all bottles made to the same design.

3. In order to make it possible, allowing for the usual uncertainties in filling, to measure the volume of the contents of measuring container bottles with sufficient accuracy, and in particular with the accuracy required by the regulations on prepackages, the maximum permissible errors (positive or negative) in the capacity of a measuring bottle container, i.e. the greatest differences permitted (positive or negative) at the temperature of 20°C and under the control conditions laid down in Annex II, between the actual capacity and the nominal capacity V_n shall be in accordance with the following table:

Nominal capacity V_n in millimetres	Maximum permissible errors	
	as a % of V_n	in millilitres
From 50 to 100	-	3
From 100 to 200	3	-
From 200 to 300	-	6
From 300 to 500	2	-
From 500 to 1000	-	10
From 1000 to 5000	1	-

The maximum permissible error in the brim capacity shall be the same as the maximum permissible error in the corresponding nominal capacity.

The systematic exploitation of tolerances shall be prohibited.

4. In practice, the actual capacity of a measuring container bottle shall be checked by determining the quantity of water at 20°C, which the bottle actually contains when filled to the level theoretically corresponding to the nominal capacity. It may also be checked indirectly by method of equivalent accuracy.

5. Every manufacturer of measuring container bottles shall submit for the approval of the competent Authority a mark by which he can be identified.

   When this Authority has given its approval, it shall inform the competent interested parties thereof within one month.

   The manufacturer shall, on his own responsibility, affix the sign ℮ (reversed epsilon) referred to in regulation 6 of the Measuring Instrument Regulations,2002 , certifying that the bottle meets the requirements of these regulations and of the Annexes thereto. However, the date, origin and reference number provided for in Annex I, subsection 6.3 to the same Regulations shall not be required.

   This sign shall be at least 3 mm high.

6. The competent Authority shall check that the measuring container bottles comply with the provisions of these regulations by sampling at the place of manufacture or, if this is not practicable, on the premises of the importer or his agent.

This statistical sampling check shall be carried out in accordance with the accepted methods of quality acceptance inspection. Its effectiveness shall be comparable to that of the reference method specified in Annex II.

7. These regulations shall not preclude any checks that may be carried out by the competent Authority in the course of trade.

8. A measuring container bottle shall bear the following indelible, easily legible and visible indications:

8.1. on its side, on the bottom rim or on the bottom:

8.1.1. an indication of its nominal capacity in litres, centilitres or millilitres in figures at least 6 mm high, if the nominal capacity is greater that 100 cl, 4 mm high if it is from 100 cl down to but not including 20 cl and 3 mm high if it is not more that 20 cl, followed by the symbol for the unit of measurement used or, where appropriate, by the name of the unit in accordance with the provisions of Schedule 1 of the Metrology Act , 2002;

8.1.2. the manufacturer's identifying mark prescribed in the first paragraph of Section 5;

8.1.3. the sign prescribed in the third paragraph of Section 5;

8.2. On the bottom or on the bottom rim, in such a manner as to avoid confusion with the previous indication, in figures on the same minimum height as those expressing the corresponding nominal capacity, according to the method or methods of filling for which the bottle is intended:

8.2.1. an indication of the brim capacity expressed in centilitres and not followed by the symbol cl,

8.2.2. and/or an indication of the distance in millimetres from the brim level to the filling level corresponding to the nominal capacity, followed by the symbol mm.

Other indication may appear on the bottle provided they do not give rise to confusion with the compulsory indications.

ANNEX II

This Annex lays down the procedures from the statistical checking of measuring container bottles in order to meet the requirements of regulation 2 of these regulations and the item 6 of Annex I.

1. METHOD OF SAMPLING

A sample of measuring container bottles of the same design and the same manufacture shall be drawn from a batch corresponding, in principle, to an hour's production.

If the result of the check on a batch corresponding to an hour's production is not satisfactory, a second test can be carried out, based either on another sample from a batch corresponding to a longer period of production or, where production has been subject to check recognized by the competent Authority , on the results recorded on the manufacturers' check-cards.

The number of measuring container bottles constituting the sample shall be 35 or 40, depending on which of the two methods of applying the results, detailed in Section 3 below, has been chosen.

2. MEASURING THE CAPACITY OF THE MEASURING CONTAINER BOTTLES CONSTITUTING THE SAMPLE

The sample container bottles shall be weighed empty.

They shall be filled with water at 20°C of a know density, up to the filling level appropriate to the method of checking used.

They shall then be weighed in full.

The check shall be carried out by means of a legal measuring instrument, suitable for effecting the necessary operations.

Error in measuring the capacity shall not be greater then one-fifth of the maximum permissible error corresponding to the nominal capacity of the measuring container bottle.

3. APPLICATION OF THE RESULTS

3.1. **Use of the standard deviation method**

The number of measuring container bottles in the sample 35.

3.1.1. Calculate as follows: (see 3.1.4.):

3.1.1.1. the average $\bar{x}$ of the actual capacities x_i of the bottles in the sample,

3.1.1.2. estimated standard deviation s of the actual capacities x_i of the bottles in the batch.

3.1.2. Calculate as follows:

3.1.2.1. The upper limit T_s: the sum of the indicated capacity (see Annex I, Section 8) and of the maximum permissible error corresponding to this capacity.

3.1.2.2. The lower limit T_i: the difference between the indicated capacity (see Annex I, Section 8) and the maximum permissible error corresponding to this capacity.

3.1.3. Acceptance criteria:

The batch shall be declared to comply with these regulations if the numbers $\bar{x}$ and s verify simultaneously the following three inequations:

$$\bar{x} + k \cdot s \leq T_s$$

$$\bar{x} - k \cdot s \geq T_i$$

$$s \leq F(T_s - T_i)$$

where $k = 1.57$ and $F = 0.266$

3.1.4 Calculation of the mean value $\bar{x}$ and the estimated standard deviation s of the batch.

Calculate as follows:

- the sum of 35 actual capacity measurements $x = \sum x_i$
- the mean value of the 35 measurements $\bar{x} = \frac{1}{35} \sum x_i$
- the sum of the squares of the 35 measurements $\sum x_i^2$
- the square of the sum of the 35 measurements $\left(\sum x_i\right)^2$, then $\frac{1}{35}\left(\sum x_i\right)^2$
- the corrected sum: $SC = \sum x_i^2 - \frac{1}{35}\left(\sum x_i\right)^2$
- the estimated variance $v = \frac{SC}{34}$

Hence the estimated standard deviation: $s = \sqrt{v}$

3.2. Use of the average of measuring range method

The number of measuring container bottles in the sample is 40.

3.2.1. Calculate as follows (see 3.2.4):

3.2.1.1. the average $\bar{x}$ of the actual capacities x_i of the bottles in the sample,

3.2.1.2. the average range $\overline{R}$ of the actual capacities x of the bottles in the sample.

3.2.2. Calculate as follows:

3.2.2.1. the upper limit T_s the sum of the indicated capacity (see Annex I, Section 8) and the maximum permissible error corresponding to capacity,

3.2.2.2. the lower limit T_i:

difference between the indicated capacity (see Annex I, Section 8) and the maximum permissible error corresponding to this capacity.

3.2.3. Acceptance criterion

The batch shall be declared to comply with these regulations if the numbers x and $\overline{R}$ verify simultaneously the following three inequations:

$$x + k' \cdot \overline{R} \leq T_s$$

$$x + k' \cdot \overline{R} \geq T_i$$

$$\overline{R} \leq F'(T_s - T_i)$$

where $k' = 0.668$,

and $F' = 0.628$.

3.2.4. Calculation of the mean value $\bar{x}$ and of the average range $\overline{R}$ of the 40 measuring container bottles in the sample.

3.2.4.1. to obtain $\bar{x}$, calculate as follows:

- the sum of the 40 actual capacity measurements $x = \sum x_i$
- the mean value of these 40 measurements:

$$\bar{x} = \frac{1}{40} \sum x_i$$

3.2.4.2. To obtain $\bar{R}$:

Divide the sample, in chronological order of selection, into eight sub-samples of five measuring container bottles each.

Calculate as follows:

- the range of each of the sup-samples, i.e. the difference between the actual capacity of the largest and the smallest of the five bottles in the sub-samples; eight ranges are thus obtained: $R_1, R_2, ..., R_8$
- the sum of the ranges of the eight sub-samples:

$$\sum R_i = R_1 + R_2 + ... + R_8$$

The average range $\bar{R}$ is therefore:

$$\bar{R} = \frac{1}{8} \sum R_i$$

Ippubblikat mid-Dipartiment ta' l-Informazzjoni – 3, Pjazza Kastilja – *Published by the Department of Information – 3, Castille Place*
Mitbugh fl-Istamperija tal-Gvern – *Printed at the Government Printing Press*

Prezz 10c – *Price 10c*